Simpson-Golabi-Behmel syndrome

Simpson-Golabi-Behmel syndrome is a condition that affects many parts of the body and occurs primarily in males. This condition is classified as an overgrowth syndrome, which means that affected infants are considerably larger than normal at birth (macrosomia) and continue to grow and gain weight at an unusual rate. The other signs and symptoms of Simpson-Golabi-Behmel syndrome vary widely. The most severe cases are life-threatening before birth or in infancy, whereas people with milder cases often live into adulthood.

People with Simpson-Golabi-Behmel syndrome have distinctive facial features including widely spaced eyes (ocular hypertelorism), an unusually large mouth (macrostomia), a large tongue (macroglossia) that may have a deep groove or furrow down the middle, a broad nose with an upturned tip, and abnormalities affecting the roof of the mouth (the palate). The facial features are often described as "coarse" in older children and adults with this condition.

Other features of Simpson-Golabi-Behmel syndrome involve the chest and abdomen. Affected infants may be born with one or more extra nipples, an abnormal opening in the muscle covering the abdomen (diastasis recti), a soft out-pouching around the belly-button (an umbilical hernia), or a hole in the diaphragm (a diaphragmatic hernia) that allows the stomach and intestines to move into the chest and crowd the developing heart and lungs.

Simpson-Golabi-Behmel syndrome can also cause heart defects, malformed or abnormally large kidneys, an enlarged liver and spleen (hepatosplenomegaly), and skeletal abnormalities. Additionally, the syndrome can affect the development of the gastrointestinal system, urinary system, and genitalia. Some people with this condition have mild to severe intellectual disability, while others have normal intelligence.

About 10 percent of people with Simpson-Golabi-Behmel syndrome develop cancerous or noncancerous tumors in early childhood. The most common tumors are a rare form of kidney cancer called Wilms tumor and a cancerous tumor called a neuroblastoma that arises in developing nerve cells.

Frequency

The incidence of Simpson-Golabi-Behmel syndrome is unknown. At least 130 people worldwide have been diagnosed with this disorder.

Genetic Changes

Mutations in the *GPC3* gene are responsible for some cases of Simpson-Golabi-Behmel syndrome. This gene provides instructions for making a protein called glypican 3, which is involved in the regulation of cell growth and division (cell proliferation). Researchers believe that the GPC3 protein can also cause certain cells to self-destruct (undergo apoptosis) when they are no longer needed, which can help establish the body's shape.

GPC3 mutations can delete part or all of the gene, or alter the structure of glypican 3. These mutations prevent the protein from performing its usual functions, which may contribute to an increased rate of cell growth and cell division starting before birth. It is unclear, however, how a shortage of functional glypican 3 causes overgrowth of the entire body and the other abnormalities characteristic of Simpson-Golabi-Behmel syndrome.

Some individuals with Simpson-Golabi-Behmel syndrome do not have identified mutations in the *GPC3* gene. In these cases, the cause of the condition is unknown.

Inheritance Pattern

This condition is inherited in an X-linked pattern. A condition is considered X-linked if the mutated gene that causes the disorder is located on the X chromosome, one of the two sex chromosomes in each cell. In males (who have only one X chromosome), one altered copy of the gene in each cell is sufficient to cause the condition. Because females have two copies of the X chromosome, one altered copy of the gene in each cell usually leads to less severe symptoms in females than in males, or it may cause no symptoms at all.

Some females who have one altered copy of the *GPC3* gene have distinctive facial features including an upturned nose, a wide mouth, and a prominent chin. Their fingernails may be malformed and they can have extra nipples. Skeletal abnormalities, including extra spinal bones (vertebrae), are also possible in affected females. Other females who carry one altered copy of the *GPC3* gene do not have these features or any other medical problems associated with Simpson-Golabi-Behmel syndrome.

Other Names for This Condition

- DGSX
- mental retardation-overgrowth syndrome
- SDYS
- SGBS
- SGBS1

- Simpson dysplasia syndrome
- Simpson syndrome

Diagnosis & Management

Genetic Testing

- Genetic Testing Registry: Simpson-Golabi-Behmel syndrome
  https://www.ncbi.nlm.nih.gov/gtr/conditions/C0796154/

Other Diagnosis and Management Resources

- GeneReview: Simpson-Golabi-Behmel Syndrome Type 1
  https://www.ncbi.nlm.nih.gov/books/NBK1219
- MedlinePlus Encyclopedia: Diastasis Recti
  https://medlineplus.gov/ency/article/001602.htm
- MedlinePlus Encyclopedia: Macrosomia
  https://medlineplus.gov/ency/article/002251.htm

General Information from MedlinePlus

- Diagnostic Tests
  https://medlineplus.gov/diagnostictests.html
- Drug Therapy
  https://medlineplus.gov/drugtherapy.html
- Genetic Counseling
  https://medlineplus.gov/geneticcounseling.html
- Palliative Care
  https://medlineplus.gov/palliativecare.html
- Surgery and Rehabilitation
  https://medlineplus.gov/surgeryandrehabilitation.html

Additional Information & Resources

MedlinePlus

- Encyclopedia: Diastasis Recti
  https://medlineplus.gov/ency/article/001602.htm
- Encyclopedia: Macrosomia
  https://medlineplus.gov/ency/article/002251.htm
- Health Topic: Congenital Heart Defects
  https://medlineplus.gov/congenitalheartdefects.html

- Health Topic: Craniofacial Abnormalities
  https://medlineplus.gov/craniofacialabnormalities.html
- Health Topic: Wilms Tumor
  https://medlineplus.gov/wilmstumor.html

Genetic and Rare Diseases Information Center

- Simpson-Golabi-Behmel syndrome
  https://rarediseases.info.nih.gov/diseases/7649/simpson-golabi-behmel-syndrome

Additional NIH Resources

- National Cancer Institute: Kidney Cancer
  https://www.cancer.gov/types/kidney
- National Cancer Institute: Neuroblastoma Home Page
  https://www.cancer.gov/types/neuroblastoma

Educational Resources

- Disease InfoSearch: Simpson-Golabi-Behmel syndrome
  http://www.diseaseinfosearch.org/Simpson-Golabi-Behmel+syndrome/6610
- MalaCards: simpson-golabi-behmel syndrome
  http://www.malacards.org/card/simpson_golabi_behmel_syndrome
- Orphanet: Simpson-Golabi-Behmel syndrome
  http://www.orpha.net/consor/cgi-bin/OC_Exp.php?Lng=EN&Expert=373

Patient Support and Advocacy Resources

- AmeriFace
  http://www.ameriface.org/
- Children's Craniofacial Association
  http://www.ccakids.com/
- CureSearch: National Childhood Cancer Foundation
  https://curesearch.org/
- National Organization for Rare Disorders (NORD)
  https://rarediseases.org/rare-diseases/simpson-dysmorphia-syndrome/

GeneReviews

- Simpson-Golabi-Behmel Syndrome Type 1
  https://www.ncbi.nlm.nih.gov/books/NBK1219

Scientific Articles on PubMed

- PubMed
  https://www.ncbi.nlm.nih.gov/pubmed?term=%28%28simpson-golabi-behmel+syndrome%5BTIAB%5D%29+OR+%28golabi-rosen+syndrome%5BTIAB%5D%29+OR+%28sgbs%5BTIAB%5D%29+OR+%28simpson+dysplasia+syndrome%5BTIAB%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+3600+days%22%5Bdp%5D

OMIM

- SIMPSON-GOLABI-BEHMEL SYNDROME, TYPE 1
  http://omim.org/entry/312870

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